

Impact Analysis

Background

TVA is conducting a comprehensive two-year study of how it operates the reservoir system in order to determine if changes in its operating policies would produce greater overall public value.

TVA policies guide the operation of the river system to achieve multiple benefits for the people of the Tennessee Valley. These benefits include year-round navigation, reduced risk of flooding, affordable and reliable electricity, recreation opportunities, adequate water supply, improved water quality, and economic growth.

The operating policies affect how much reservoir levels rise and fall, when changes in reservoir levels occur, and the amount of water flowing through the reservoir system at different times of year, depending on rainfall.

Resource Areas

Resource areas are aspects of the Valley's environment and quality of life that could be affected by changes in the operation of the Tennessee River system. A total of 24 resource areas cover land and water resources and are addressed in the draft Environmental Impact Statement (DEIS).

The evaluation of possible alternative policies for operating the river system began with the collection of data to determine the existing condition of each resource area. Computer models were used to project the responses of some individual resource areas to each policy alternative considered in detail. For example, computer models generated data on reservoir levels, flow, and water quality that were used to evaluate the impacts on the various resource areas. This fact sheet summarizes the projected impacts.

To provide your comments

To make sure your comments on the alternatives in the DEIS are recorded accurately, please use one of the computers available at a community workshop, talk with a court reporter at a workshop, or write your comments on a comment card and return it to TVA. You may also submit comments by visiting www.tva.com/ros, faxing TVA at 865-632-3146, or writing to **ROS Project Manager David Nye, TVA, c/o WT 11A, 400 West Summit Hill Drive, Knoxville, TN 37902.**

The public comment period for the ROS continues through September 4, 2003. More information is available on TVA's Web site at www.tva.com/ros or by phoning TVA toll-free at 888-882-7675.

Air Resources

- The effects on air quality and climate change resulting from power plant emissions were analyzed for each alternative. The Equalized Summer/Winter Flood Risk Alternative would have the greatest potential for adverse impacts on air quality resulting from power plant emissions; however none of the policy alternatives would have substantial impacts.

Climate

- Some policy alternatives would result in a change in the mix of power generating resources for power customers. The Reservoir Recreation A and B Alternatives and the Tailwater Habitat Alternative would have the greatest potential impact on climate from the greenhouse gas emissions generated by the increased use of fossil and nuclear plants.

Water Quality

- The effects of alternative operating policies on the quality of water in the reservoirs and in dam releases were evaluated using water quality models and data from TVA's Vital Signs Monitoring Program. The primary water quality characteristics examined included dissolved oxygen concentrations, water temperature, and chlorophyll concentrations (used as an indicator of algal activity). Policy alternatives that reduce flows through the reservoir system (Reservoir Recreation B, Tailwater Recreation, and Tailwater Habitat) would result in the greatest adverse impacts to water quality compared to the base case.

Water Supply

- Each alternative was evaluated in relation to reservoir level impacts on water intakes (water supply delivery costs) and raw water quality effects on water treatment plants. The Summer Hydropower Alternative and the Commercial Navigation Alternative had adverse and slightly adverse impacts to water supply delivery costs respectively, but other policy alternatives had slightly beneficial impacts to water supply delivery costs. Each of the policy alternatives except the Commercial Navigation Alternative would result in degraded raw water quality at water treatment plants (thereby requiring potential additional treatment).

Groundwater Resources

- Changes in reservoir elevations can lead to corresponding changes in groundwater elevations depending on the hydrogeology of shallow aquifers. For all the policy alternatives, the effects of different reservoir operations on the use of groundwater resources would be either beneficial or not substantial.

Aquatic Resources

- The effects on aquatic resources (biodiversity, sport fisheries, and commercial fisheries) were analyzed for each policy alternative. No policy alternative represents a clear benefit to all aquatic resources. Overall, the Commercial Navigation Alternative would result in the least change from the base case, with some potential minor benefits. Biodiversity would generally not benefit from any alternative. Sport fisheries would experience slight benefits under the Reservoir Recreation Alternative B and the Tailwater Recreation Alternative, although the results would be variable depending on the type of water body. Commercial fisheries (especially mussels) would experience adverse impacts under all policy alternatives except the Summer Hydropower Production Alternative, where higher summer flows would benefit water quality, and the Commercial Navigation Alternative, which would be the same as base case.

Wetlands

- The effects on wetland location, type, and function resulting from changes in water levels, duration, and timing were analyzed for each alternative. The largest impacts from the proposed policy alternatives would be the potential effects on wetland extent and wetland vegetation types. The base case and Commercial Navigation Alternative would have the least impact on wetland location, type, and function. The Reservoir Recreation A and B, Equalized Summer/Winter Flood Risk, Tailwater Recreation, and Tailwater Habitat Alternatives would have increased negative impacts on wetlands.

Aquatic Plants (Including Invasive Aquatic Plants)

- The change in coverage of submersed and floating-leaved aquatic plants was analyzed for each alternative. With the exception of the Summer Hydropower Production Alternative, which would substantially decrease aquatic plant coverage, none of the policy alternatives is expected to result in noticeable cover changes in mainstem reservoirs. Most of the alternatives would slightly increase coverage in tributary storage reservoirs. In most instances, natural environmental factors such as weather would override the effects of the various alternatives.

Terrestrial Ecology

- The effects on wildlife and terrestrial plant communities would be most notable on flats, scrub/shrub, and bottomland hardwood habitats and on migrating shorebirds under these alternatives: Reservoir Recreation A, Summer Hydropower Production, Equalized Summer/Winter Flood Risk, and Tailwater Recreation. The Summer Hydropower Production alternative would have the greatest impact on lowland plant communities and wildlife, particularly migrating shorebirds and waterfowl.

Invasive Terrestrial and Aquatic Animals and Terrestrial Plants

- The effects on invasive animals and terrestrial plants resulting from changes in reservoir levels were analyzed for each alternative. None of the policy alternatives would have a substantial impact on invasive animals or terrestrial plants.

Vector Control

- The effects on reservoir mosquito populations were analyzed for each alternative. None of the policy alternatives would substantially increase reservoir mosquito populations. The Summer Hydropower Production Alternative would have the most impact because the lowered water levels would decrease reservoir mosquito populations.

Threatened and Endangered Species

- The possible effects of each alternative were evaluated with regard to the 526 federal- and state-listed endangered, threatened, or special-concern species known to occur within one mile around the reservoirs and tailwaters involved in this study. The base case and the Commercial Navigation Alternative would not result in additional adverse effects on these protected species. Each of the other policy alternatives would result in some adverse effects on protected terrestrial species which use habitats along reservoir shorelines. Each of the other policy alternatives would also result in adverse changes in summer water temperatures in some tailwater habitats where protected aquatic species occur.

Managed Areas and Ecologically Significant Sites

- The effects on managed areas and ecologically significant sites resulting from changes in reservoir levels were analyzed for each alternative. None of the policy alternatives would have a significant impact on managed areas or ecologically significant sites. The Summer Hydropower Production Alternative would have the most impact because of increased inundation of wildlife management areas and the consequent impact on habitat for migrating shorebirds and native game birds.

Land use

- The potential impacts on land use within one-quarter mile of TVA reservoirs and tailwaters were evaluated for each alternative. None of the policy alternatives would have a significant impact on land use within one-quarter mile of TVA reservoirs and tailwaters or the rate of shoreline development. The Reservoir Recreation Alternatives A and B and the Tailwater Recreation Alternative would have the most impact on land use (slightly adverse to the natural condition of the shoreline) because increased reservoir recreational opportunities and improved visual quality might contribute to an increased rate of residential development.

Shoreline Erosion

- The rates of erosion on reservoir shorelines and on stream banks of tributary tailwaters were analyzed for each alternative. Holding reservoir pools up longer increases shoreline erosion due to wave action and tailwater erosion due to the prolonged high discharge required to lower the reservoir to its winter elevation. Erosion rates would be slightly increased under Reservoir Recreation Alternatives A and B and the Tailwater Recreation Alternative; the rates would be slightly decreased under the Summer Hydropower Production Alternative, the Equalized Summer/Winter Flood Risk Alternative, and the Tailwater Habitat Alternative.

Prime Farmland

- Farmland conversion is the key issue for impacts on prime farmland, with soil erosion as a secondary effect. Policy alternatives that enhance the quality of the land bordering the river system would increase the potential for these effects. None of these potential impacts would be substantially different from the base case.

Cultural Resources

- The effects of reservoir operations on archaeological resources, historic preservation, and historic structures were analyzed for each alternative. For archaeological resources, the Summer Hydropower Production and the Equalized Summer/Winter

Flood Risk Alternatives would be less adverse than existing operating policy, while the Reservoir Recreation Alternative A would be more adverse than existing policy. The Reservoir Recreation A and B, Equalized Summer/Winter Flood Risk, Tailwater Recreation, and Tailwater Habitat Alternatives would have the most adverse impacts on historic structures.

Visual Resources

- The effects on the integrity of visual resources resulting from the barren zone, or “bathtub ring,” that occurs immediately around the shorelines as reservoir levels are drawn down, from the exposure of reservoir bottoms and flats at lower pool levels, and from shoreline development factors affected by fluctuating water levels were analyzed for each alternative. The Reservoir Recreation B, Tailwater Recreation, and Tailwater Habitat Alternatives would provide the greatest degree of improvement in scenic integrity and overall scenic attractiveness. The Summer Hydropower Production and Equalized Summer/Winter Flood Risk Alternatives would reduce scenic integrity.

Dam Safety

- The effects on reservoir-triggered seismicity (RTS) due to changes in filling or drawdown rates, or higher than normal reservoir levels as well as dam stability, changes in seismicity, and leakage from dams in response to higher lake levels in areas containing underground streams and caves developed in limestone and dolomite rocks were analyzed for each alternative. Geology and seismology, normal and flood reservoir levels, reservoir drawdown rates, and leakage would not be adversely affected by the alternatives evaluated. Only two dams would experience higher maximum normal water levels under the alternatives evaluated, but due to the size of these dams the higher reservoir levels would not have an adverse effect on dam safety.

Navigation

- Changes in the timing and depth of navigation channels in TVA reservoirs were analyzed for each alternative. The Summer Hydropower Production and Equalized Flood Risk Alternatives would reduce the navigation channel depth and have the most adverse impacts. The Commercial Navigation Alternative would provide the most beneficial impacts on channel depths.

Flood Control

- The effects of alternative reservoir operations policies on flood control in the Tennessee River basin were estimated by assessing changes in the risk of flooding. To evaluate changes in flood risk, TVA used a computer model to mimic how historic Tennessee River Valley inflows would be stored and released by the TVA reservoirs under various alternative policies. Changes in flooding were measured by comparing different peak flows (or elevations) and flood damage at selected locations to those expected under the current reservoir operations policy. For all of the policy alternatives, in some locations during some seasons, flood control would be adversely affected. Under Reservoir Recreation Alternative B, Tailwater Recreation, and Tailwater Habitat, there would be a substantial increase in flood risk.

Power

- The effects on power generation dispatch, the cost of power, and the power reliability system were analyzed for each alternative. Those policy alternatives that hold water levels higher longer (Reservoir Recreation A and B, Equalized Summer/Winter Flood Risk, and Tailwater Recreation) would have the most adverse impacts. The greatest adverse impact would be from the Tailwater Habitat Alternative.

Recreation

- The impacts on public, commercial, and private recreation use at 35 reservoir projects were analyzed for each alternative. The most beneficial effects on recreation use would result from these alternatives: Reservoir Recreation A and B, Equalized Summer/Winter Flood Risk, Tailwater Recreation, and Tailwater Habitat. The Summer Hydropower and Commercial Navigation Alternatives would have only slightly negative impacts.

Social and Economic Resources

- Changes in population, employment, personal income, and gross regional product were analyzed for each alternative. Only the Commercial Navigation Alternative would produce a positive impact on the regional economy. The Tailwater Habitat Alternative would have the least beneficial impact on the region.